

### **III. Remarks**

#### **A. Status**

Claims 1-57 are pending herein. Claims 23-36 have been withdrawn from consideration. Claims 1, 9, 12, 19, 37, 41, 49, 50 and 57 are amended. The outstanding Office Action and present Response are drawn to Claims 1-22 and 37-57.

#### **B. Affirmation of Election**

The election with traverse made in a telephone conversation with the undersigned on March 4, 2004 to prosecute the invention of Group I, namely claims 1-22 and 37-57 is hereby affirmed.

#### **C. Rejection Under 35 U.S.C. § 102(b)**

Claims 1, 2, 4-13, 15-22 and 49-55 stand rejected under 35 U.S.C. §102(b) over Schlegl et al. (Anal. Chem. 63, pp.241-247) (hereinafter referred to as "Schlegl"). As provided in MPEP § 2131, "[t]o anticipate a claim, the reference must teach every element of the claim . . .". Therefore, Schlegl must teach all of the elements of claims 1, 2, 4-13, 15-22 and 49-55 to sustain this rejection. Applicant respectfully traverses this rejection on the following grounds.

#### **Claims 1, 2 and 4 –11**

Independent claim 1 is directed to a method of producing a metal surface having a desired localized surface plasmon resonance wavelength. The method includes depositing metal onto a substrate that does not have a mask prearranged thereon and controlling one or more deposition parameters of the depositing step to tailor the localized surface plasmon resonance of the metal to a desired wavelength.

Schlegl discloses a study that examined the relationship between surface-enhanced resonance Raman scattering (SERRS) intensity and the rate of deposition during silver-island film preparation. Schlegel discloses that the effect of the deposition rate on the optical properties of the films at specific wavelengths was also analyzed. Schlegel also discloses that the optical density of such films was linearly related to the SERRS intensity and that maximal enhancement

was observed for films with the greatest extinction at such wavelengths. Further, Schlegl discloses that the goal of the work described therein was to examine the effect of deposition rate on the surface morphology and optical properties of silver films and to correlate these properties with the Raman scattering intensity.

Contrary to the method of claim 1, however, Schlegl does not teach, suggest or motivate a process in which the parameters of the deposition of the metal on a substrate can be controlled to tailor the localized surface plasmon surface resonance of the metal surface to a desired wavelength.

The techniques for tailoring or tuning a metal surface to have a desired localized surface plasmon resonance wavelength are disclosed throughout the present application. For instance, the present application discloses at page 14 line 24 to page 15 line 3 that:

As the example of Figs. 1 and 2 illustrate, the maximum extinction LSPR wavelength of the different enhancement surfaces occurs at various points throughout the excitation wavelengths 400 nm through 800 nm. Thus, according to various embodiments of the present invention, deposition parameters may be controllably varied to produce an enhancement surface having a LSPR with an extinction wavelength tailored to any desired point within the visible (i.e., 400-700 nm) and nearby parts of the infrared and ultraviolet spectra. (emphasis added).

At best, Schlegl discloses that the deposition parameters have an effect on the properties of such silver-island films, but clearly does not teach, suggest or motivate how to control, or even that such parameters can be controlled, to arrive at a desired localized surface plasmon resonance wavelength. Schlegl describes certain properties of the silver-island films at particular wavelengths. For instance Schlegl discloses at page 244, col 2, lines 34-40 that:

The 514.5-nm Ar<sup>+</sup> line was chosen as the excitation wavelength for two reasons. First, this line is coincident with an electronic transition in ZnTPP and produces resonance Raman scattering. . . . Second, the optical properties of the films change dramatically with deposition rate at this wavelength.

Schlegl, however, is completely lacking in any disclosure of how to produce films in which the surface thereof has a localized surface plasmon resonance of a desired wavelength.

Accordingly, Schlegl does not teach, suggest or motivate the method of claim 1 in which the deposition parameters of a metal are controlled to tailor the localized surface plasmon resonance of the metal to a desired wavelength. Therefore, the rejection under 35 U.S.C.

§102(b) of claim 1 and claims 2 and 4-11 which depend, directly or indirectly, from claim 1 over Schlegl is improper and should be withdrawn.

**Claims 12-13 and 15-22**

Independent claim 12 is directed to a method of producing an enhancement surface for use in a surface-enhanced spectroscopy process, wherein the enhancement surface has a desired localized surface plasmon resonance wavelength. The method includes:

determining the wavelength of an excitation light source used in the surface-enhanced spectroscopy process;

determining an appropriate value for one or more deposition parameters to use in depositing metal onto a substrate to produce an enhancement surface having a localized surface plasmon resonance wavelength that provides optimum enhancement for the excitation light source; and

depositing metal onto a substrate in accordance with the determined value for one or more deposition parameters to produce an enhancement surface having the localized surface plasmon resonance wavelength that provides optimum enhancement for the excitation light source, wherein the substrate does not have a mask prearranged thereon.

As noted above, Schlegl discloses a study that examined the relationship between surface-enhanced resonance Raman scattering (SERRS) intensity and the rate of deposition during silver-island film preparation. Schlegel, however, does not disclose or suggest a method for producing an enhancement surface for use in a surface-enhanced spectroscopy process in which a deposition parameter value is determined so that the enhancement surface has a particular localized surface plasmon resonance wavelength. Again, at best Schlegel discloses that the deposition parameters have an effect on the properties of silver-island films, but does not teach, suggest or motivate how to control, or even that such parameters can be controlled, to arrive at a particular localized surface plasmon resonance wavelength.

Accordingly, Schlegl does not teach, suggest or motivate the method of claim 12 for producing an enhancement surface for use in a surface-enhanced spectroscopy process, wherein the enhancement surface has a desired localized surface plasmon resonance wavelength. Therefore, the rejection under 35 U.S.C. §102(b) of claim 12 and claims 13 and 15-22 which depend, directly or indirectly, from claim 12 over Schlegl is improper and should be withdrawn.

**Claims 49-55**

Independent claim 49 is directed to a method of deriving a control algorithm for controlling a deposition process in a manner that results in the deposition process producing a metal film that has a localized surface plasmon resonance of a desired wavelength. The method includes:

- utilizing a deposition process to deposit metal samples onto one or more substrates;
- varying the value of at least one deposition parameter for each of the metal samples deposited;
- analyzing the metal samples to determine the effect of the at least one deposition parameter on the localized surface plasmon resonance wavelength of the metal samples; and
- based on the analyzing step, determining the control algorithm that defines a resulting localized surface plasmon resonance wavelength of a metal film produced by the deposition process as a function of the at least one deposition parameter.

As noted above, Schlegl discloses a study that examined the relationship between surface-enhanced resonance Raman scattering (SERRS) intensity and the rate of deposition during silver-island film preparation. Schlegel, however, does not disclose or suggest a method of deriving a control algorithm for controlling a deposition process in a manner that results in the deposition process producing a metal film that has a localized surface plasmon resonance of a desired wavelength. Again, at best Schlegel discloses that the deposition parameters have an effect on the properties of silver-island films, but does not teach, suggest or motivate how to control, or even that such parameters can be controlled, to arrive at a desired localized surface plasmon resonance wavelength.

Accordingly, Schlegl does not teach, suggest or motivate the method of claim 49 for deriving a control algorithm for controlling a deposition process in a manner that results in the deposition process producing a metal film that has a localized surface plasmon resonance of a desired wavelength. Therefore, the rejection under 35 U.S.C. §102(b) of claim 49 and claims 50-55 which depend, directly or indirectly, from claim 49 over Schlegl is improper and should be withdrawn.

**D. Rejection Under 35 U.S.C. § 103(a)**

Claims 3, 14, 37-48, 56 and 57 stand rejected under 35 U.S.C. §103(a) over Schlegl. Insofar as it may be applied against the present claims, this rejection is respectfully traversed.

According to MPEP § 2142, to establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references must teach or suggest all the claim limitations.

**Claims 3, 14, 56 and 57**

Claim 3 depends from and includes the subject matter of claim 1. Claim 14 depends from and includes the subject matter of claim 12. Claims 56-57 depend from and include the subject matter of claim 49. The deficiencies of Schlegl with respect to the subject matter of claims 1, 12 and 49 is discussed above. Applicant submits that Schlegl does not disclose or suggest the subject matter of claims 3, 14 and 56-57 for at least the same reasons as noted above with respect to claims 1, 12 and 49. Moreover, Schlegl does not disclose or suggest that the deposition parameters of substrate temperature, deposition rate or the amount of metal deposited, can be controlled or that an appropriate value or such parameters can be determined. As noted above, Schlegl at best discloses that such parameters have an effect on the properties of such deposited metal films. With respect to claims 56-57, Schlegl is completely lacking in any disclosure of the derivation of a control algorithm and certainly does not disclose that such an algorithm can be coded into executable software code or that such software code is executable to determine values for such deposition parameters to produce a metal film having a localized surface plasmon resonance of a desired wavelength.

Thus, applying the criteria set forth in MPEP § 2142, Applicant submits that Schlegl does not disclose or suggest all of the subject matter of claims 3, 14 or 56-57. Since Schlegl does not disclose or suggest all of the elements of claims 3, 14 or 56-57, the third criteria of a prima facie case of obviousness has not been met with respect to claims 3, 14 or 56-57. Because one of the criteria has not been met, a prima facie case of obviousness has not been made.

Furthermore, there is no suggestion or motivation to modify Schlegl to include the missing subject matter noted above. Finally, since Schlegl does not even contemplate the production of a

metal film having a localized surface plasmon resonance of a desired wavelength, there cannot be a reasonable expectation of success. Therefore, Applicant submits that a prima facie case of obviousness over Schlegl has not been made with respect to claims 3, 14 or 56-57 because none of the three criteria of the prima facie case has been satisfied.

In view of the foregoing, Applicant respectfully requests that the rejection of claims 3, 14 or 56-57 under 35 U.S.C. § 103(a) over Schlegl be withdrawn.

#### **Claims 37-48**

Claim 37 is directed to a method of producing a metal film having a desired localized surface plasmon resonance wavelength. The method includes:

determining appropriate values for deposition parameters to use in depositing metal onto a substrate to produce a metal film having a localized surface plasmon resonance of a desired wavelength, wherein the deposition parameters include deposition rate, substrate temperature, and thickness of the metal film; and

depositing the metal onto the substrate in accordance with the determined deposition parameter values to produce a metal film having the localized surface plasmon resonance of a desired wavelength.

As noted above, Schlegl discloses a study that examined the relationship between surface-enhanced resonance Raman scattering (SERRS) intensity and the rate of deposition during silver-island film preparation. Schlegel, however, does not disclose or suggest a method of producing a metal film having a desired localized surface plasmon resonance wavelength. Again, at best Schlegel discloses that certain deposition parameters have an effect on the properties of silver-island films, but does not teach, suggest or motivate how to control, or even that such parameters can be controlled, to arrive at a desired localized surface plasmon resonance wavelength.

Thus, applying the criteria set forth in MPEP § 2142, Applicant submits that Schlegl does not disclose or suggest all of the subject matter of claim 37. Since Schlegl does not disclose or suggest all of the elements of claim 37, the third criteria of a prima facie case of obviousness has not been met with respect to claim 37. Because one of the criteria has not been met, a prima facie case of obviousness has not been made.

Furthermore, there is no suggestion or motivation to modify Schlegl to include the missing subject matter noted above. Finally, since Schlegl does not even contemplate the production of a metal film having a localized surface plasmon resonance of a desired wavelength, there cannot be a reasonable expectation of success. Therefore, Applicant submits that a prima facie case of obviousness over Schlegl has not been made with respect to claim 37 because none of the three criteria of the prima facie case has been satisfied. Therefore, the rejection under 35 U.S.C. §103(a) of claim 37 and claims 38-48 which depend, directly or indirectly, from claim 37 over Schlegl is improper and should be withdrawn.

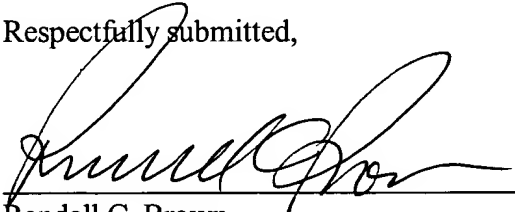
**E. Conclusion**

It is believed that all matters set forth in the Office action have been addressed. Applicant has made a diligent effort to advance the prosecution of this application by amending claims 1, 9, 12, 19, 37, 41, 49, 50 and 57 and by submitting arguments in support of the patentability of claims 1-22 and 37-57.

In light of the foregoing amendments and remarks, Applicant submits that claims 1-22 and 37-57 are in condition for allowance, and an early formal notice of allowance of claims 1-22 and 37-57 is respectfully requested. Should the Examiner have any questions, he is invited to telephone the undersigned at the telephone number listed below.

Respectfully submitted,

Date: 6/16/04

  
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